

10/563976

JAP15 Rec'd 2006 09 JAN 2006

HOI-14402.ST25.txt
SEQUENCE LISTING

<110> Sorensen, Anders Per
Benfield, Thomas Lars
Lundgren, Jens Dilling
Kempe, Thomas D.

<120> BINDING MEMBER TOWARDS PNEUMOCOCCUS SURFACE ADHESIN A PROTEIN
(PsaA)

<130> HOI-14402/16

<150> PCT/DK04/000492
<151> 2004-07-08

<150> US 60/486,647
<151> 2003-07-11

<150> PA 2003 01044
<151> 2003-07-08

<160> 56

<170> PatentIn version 3.3

<210> 1
<211> 33
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(33)
<223> Sequence from human antibody generated in mouse.

<400> 1
cgg ggc agt cag ggt att agc agc tgg tta gcc 33
Arg Ala Ser Gln Gly Ile Ser Ser Trp Leu Ala
1 5 10

<210> 2
<211> 11
<212> PRT
<213> Homo sapiens

<400> 2
Arg Ala Ser Gln Gly Ile Ser Ser Trp Leu Ala
1 5 10

<210> 3
<211> 21
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(21)
<223> Sequence from human antibody generated in mouse.

HOI-14402.ST25.txt

<400> 3
gtt gca tcc agt ttg caa agt 21
Val Ala Ser Ser Leu Gln Ser
1 5

<210> 4
<211> 7
<212> PRT
<213> Homo sapiens

<400> 4
Val Ala Ser Ser Leu Gln Ser 21
1 5

<210> 5
<211> 27
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(27)
<223> Sequence from human antibody generated in mouse.

<400> 5 27
caa cag tat aat agc tat cct ccg acg
Gln Gln Tyr Asn Ser Tyr Pro Pro Thr
1 5

<210> 6
<211> 9
<212> PRT
<213> Homo sapiens

<400> 6
Gln Gln Tyr Asn Ser Tyr Pro Pro Thr
1 5

<210> 7
<211> 321
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(321)
<223> Sequence from human antibody generated in mouse. V-segment: 4-34
and J-segment: JK1

<220>
<221> CDR1
<222> (70)..(120)

<220>

HOI-14402.ST25.txt

<221> CDR2
<222> (148) .. (168)

<220>
<221> CDR3
<222> (265)..(291)

```

<400> 7
gac atc cag atg acc cag tct cca tcc tca ctg tct gca tct gta gga
Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val Gly
1           5           10          15

```

```

gac aga gtc acc atc act tgt cgg gcg agt cag ggt att agc agc tgg      96
Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Ser Trp
  20           25           30

```

tta gcc tgg tat cag cag aaa cca gag aaa gcc cct gag tcc ctg atc 144
 Leu Ala Trp Tyr Gln Gln Lys Pro Glu Lys Ala Pro Glu Ser Leu Ile
 35 40 45

tat gtt gca tcc agt ttg caa agt ggg gtc cca tca agg ttc agc ggc 192
 Tyr Val Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
 50 55 60

```

agt gga tct ggg aca gat ttc act ctc acc atc agc agc ctg cag cct 240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65           70           75           80

```

gaa gat ttt gca act tat tac tgc caa cag tat aat agc tat cct ccg 288
 Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro Pro
 85 90 95

acg ttc ggc caa ggg acc aag gtg gaa atc aaa
 Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
 100 105

<210> 8
<211> 107
<212> PRT
<213> Homo sapiens

<400> 8

Asp	Ile	Gln	Met	Thr	Gln	Ser	Pro	Ser	Ser	Leu	Ser	Ala	Ser	Val	Gly
1					5				10					15	

Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Gly Ile Ser Ser Trp
20 25 30

Leu Ala Trp Tyr Gln Gln Lys Pro Glu Lys Ala Pro Glu Ser Leu Ile
35 40 45

Tyr Val Ala Ser Ser Leu Gln Ser Gly Val Pro Ser Arg Phe Ser Gly
50 55 60

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Gln Pro
65 70 75 80

HOI-14402.ST25.txt

Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln Tyr Asn Ser Tyr Pro Pro
85 90 95

Thr Phe Gly Gln Gly Thr Lys Val Glu Ile Lys
100 105

<210> 9
<211> 15
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(15)
<223> Sequence from human antibody generated in mouse.

<400> 9
ggc ttc tcc tgg agc 15
Gly Phe Ser Trp Ser
1 5

<210> 10
<211> 5
<212> PRT
<213> Homo sapiens

<400> 10

Gly Phe Ser Trp Ser
1 5

<210> 11
<211> 51
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(51)
<223> Sequence from human antibody generated in mouse.

<400> 11
gaa atc gat tat aga gga agc acc aac tac aac ccg tcc ctc aag agt 48
Glu Ile Asp Tyr Arg Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys Ser
1 5 10 15

cga 51
Arg

<210> 12
<211> 17
<212> PRT
<213> Homo sapiens

HOI-14402.ST25.txt

<400> 12

Glu Ile Asp Tyr Arg Gly Ser Thr Asn Tyr Asn Pro Ser Leu Lys Ser
1 5 10 15

Arg

<210> 13
<211> 21
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(21)
<223> Sequence from human antibody generated in mouse.

<400> 13
ggg ggg ccc cgc ttt gac tac
Gly Gly Pro Arg Phe Asp Tyr
1 5

21

<210> 14
<211> 7
<212> PRT
<213> Homo sapiens

<400> 14

Gly Gly Pro Arg Phe Asp Tyr
1 5

<210> 15
<211> 345
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(345)
<223> Sequence from human antibody generated in mouse.

V-segment: 4-34, D-segment: unknown, J-segment: JH4b

<220>
<221> CDR1
<222> (91)..(102)

<220>
<221> CDR2
<222> (148)..(199)

<220>
<221> CDR3
<222> (191)..(312)

HOI-14402.ST25.txt

HOI-14402.ST25.txt

Arg Gly Gly Pro Arg Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr
100 105 110

Val Ser Ser
115

<210> 17
<211> 33
<212> DNA
<213> synthetic

<220>
<221> CDS
<222> (1)..(33)

<220>
<221> misc_feature
<222> (33)..(33)
<223> unknown nucleotide

<400> 17
agg gcc agt cag agt gtt agc agc tac tta gcn
Arg Ala Ser Gln Ser Val Ser Ser Tyr Leu Ala
1 5 10

33

<210> 18
<211> 11
<212> PRT
<213> synthetic

<220>
<221> misc_feature
<222> (33)..(33)
<223> unknown nucleotide

<400> 18

Arg Ala Ser Gln Ser Val Ser Ser Tyr Leu Ala
1 5 10

<210> 19
<211> 21
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(21)
<223> Sequence from human antibody generated in mouse.

<400> 19
gat gca tcc aac agg gcc act
Asp Ala Ser Asn Arg Ala Thr
1 5

21

HOI-14402.ST25.txt

<210> 20
<211> 7
<212> PRT
<213> Homo sapiens

<400> 20

Asp Ala Ser Asn Arg Ala Thr
1 5

<210> 21
<211> 27
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(27)
<223> Sequence from human antibody generated in mouse.

<400> 21
cag cag cgt agc aac tgg cct ctc act
Gln Gln Arg Ser Asn Trp Pro Leu Thr
1 5

27

<210> 22
<211> 9
<212> PRT
<213> Homo sapiens

<400> 22

Gln Gln Arg Ser Asn Trp Pro Leu Thr
1 5

<210> 23
<211> 321
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(318)
<223> Sequence from human antibody generated in mouse. V-segment: L6
and J-segment: JK4

<220>
<221> CDR1
<222> (70)..(102)

<220>
<221> misc_feature
<222> (102)..(102)
<223> unknown nucleotide

<220>
<221> CDR2

HOI-14402.ST25.txt

<222> (148)..(168)

<220>

<221> CDR3

<222> (265)..(291)

<400> 23

gaa att gtg ttg aca cag tct cca gcc acc ctg tct ttg tct cca ggg	48
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly	
1 5 10 15	

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc tac	96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr	
20 25 30	

tta gcn tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc atc	144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile	
35 40 45	

tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt ggc	192
Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly	
50 55 60	

agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag cct	240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro	
65 70 75 80	

gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg cct ctc	288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Leu	
85 90 95	

act ttc ggc gga ggg acc aag gtg gag atc aaa	321
Thr Phe Gly Gly Thr Lys Val Glu Ile	
100 105	

<210> 24

<211> 106

<212> PRT

<213> Homo sapiens

<220>

<221> misc_feature

<222> (102)..(102)

<223> unknown nucleotide

<400> 24

Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly	
1 5 10 15	

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr	
20 25 30	

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile	
35 40 45	

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly	
50 55 60	

HOI-14402.ST25.txt

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro
65 70 75 80

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Leu
85 90 95

Thr Phe Gly Gly Thr Lys Val Glu Ile
100 105

<210> 25
<211> 15
<212> DNA
<213> synthetic

<220>
<221> CDS
<222> (1)..(15)

<400> 25
atc ttt ggg atg agc 15
Ile Phe Gly Met Ser
1 5

<210> 26
<211> 5
<212> PRT
<213> synthetic

<400> 26

Ile Phe Gly Met Ser
1 5

<210> 27
<211> 51
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(51)
<223> Sequence from human antibody generated in mouse.

<400> 27
aac ata aag caa gat gga agt gag aaa tac tat gtg gac tct gtg aag 48
Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val Lys
1 5 10 15

ggc 51
Gly

<210> 28
<211> 17

HOI-14402.ST25.txt

<212> PRT
<213> Homo sapiens

<400> 28

Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val Lys
1 5 10 15

Gly

<210> 29
<211> 57
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(57)
<223> Sequence from human antibody generated in mouse.

<400> 29
gat cgg ttt tac tat ggt tcg ggg agt tat tat tac tac tac aac ggt 48
Asp Arg Phe Tyr Tyr Gly Ser Gly Ser Tyr Tyr Tyr Tyr Tyr Asn Gly
1 5 10 15

atg gac gtc 57
Met Asp Val

<210> 30
<211> 19
<212> PRT
<213> Homo sapiens

<400> 30

Asp Arg Phe Tyr Tyr Gly Ser Gly Ser Tyr Tyr Tyr Tyr Tyr Asn Gly
1 5 10 15

Met Asp Val

<210> 31
<211> 384
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(384)
<223> Sequence from human antibody generated in mouse.

V-segment:3-7, d-segment: 3-10 and J-segment JH6b

<220>

HOI-14402.ST25.txt

<221> CDR1
<222> (91)..(102)

<220>
<221> CDR2
<222> (148) .. (198)

<220>
<221> CDR3
<222> (295) .. (351)

<400> 31
gag gtg caa cta gtg gag tct ggg gga ggc ttg gtc cag cct ggg ggg 48
Glu Val Gln Leu Val Glu Ser Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

tcc ctg aga ctc tcc tgt gca gcc tct gga ttc acc ttt aat atc ttt 96
 Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Ile Phe
 20 25 30

ggg atg agc tgg gtc cgc cag gct cca ggg aaa ggg ctg gag tgg gtg 144
 Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
 35 40 45

```

gcc aac ata aag caa gat gga agt gag aaa tac tat gtg gac tct gtg      192
Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
   50          55          60

```

```

aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat 240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65          70          75          80

```

ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt 288
 Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
 85 90 95

```

gca agg gat cgg ttt tac tat ggt tcg ggg agt tat tat tac tac tac 336
Ala Arg Asp Arg Phe Tyr Tyr Gly Ser Gly Ser Tyr Tyr Tyr Tyr Tyr Tyr
          100           105           110

```

```

aac ggt atg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca 384
Asn Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
           115          120          125

```

<210> 32
<211> 128
<212> PRT
<213> Homo sapiens

<400> 32

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Asn Ile Phe
20 25 30

Gly Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

HOI-14402.ST25.txt

Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Tyr Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Arg Phe Tyr Tyr Gly Ser Gly Ser Tyr Tyr Tyr Tyr
100 105 110

Asn Gly Met Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 33
<211> 33
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)...(33)
<223> Sequence from human antibody generated in mouse.

<400> 33
agg gcc agt cag agt gtt agc agc tac tta gcc 33
Arg Ala Ser Gln Ser Val Ser Ser Tyr Leu Ala
1 5 10

<210> 34
<211> 11
<212> PRT
<213> Homo sapiens

<400> 34
Arg Ala Ser Gln Ser Val Ser Ser Tyr Leu Ala
1 5 10

<210> 35
<211> 21
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)...(21)
<223> Sequence from human antibody generated in mouse.

<400> 35
gat gca tcc aac agg gcc act
Asp Ala Ser Asn Arg Ala Thr

HOI-14402.ST25.txt

1 5

<210> 36
<211> 7
<212> PRT
<213> Homo sapiens

<400> 36

Asp Ala Ser Asn Arg Ala Thr
1 5

<210> 37
<211> 30
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(30)
<223> Sequence from human antibody generated in mouse.

<400> 37
cag cag cgt agc aac tgg cct cca ttc act
Gln Gln Arg Ser Asn Trp Pro Pro Phe Thr
1 5 10

30

<210> 38
<211> 10
<212> PRT
<213> Homo sapiens

<400> 38

Gln Gln Arg Ser Asn Trp Pro Pro Phe Thr
1 5 10

<210> 39
<211> 324
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(324)
<223> Sequence from human antibody generated in mouse.

V-segment: L6 and J-segment: JK3

<220>
<221> CDR1
<222> (70)..(102)

<220>
<221> CDR2
<222> (148)..(168)

HOI-14402.ST25.txt

<220>

<221> CDR3

<222> (265)..(294)

<400> 39

gaa att gtg aca cag tct cca gcc acc ctg tct ttg tct cca ggg	48
Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly	
1 5 10 15	

gaa aga gcc acc ctc tcc tgc agg gcc agt cag agt gtt agc agc tac	96
Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr	
20 25 30	

tta gcc tgg tac caa cag aaa cct ggc cag gct ccc agg ctc ctc atc	144
Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile	
35 40 45	

tat gat gca tcc aac agg gcc act ggc atc cca gcc agg ttc agt ggc	192
Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly	
50 55 60	

agt ggg tct ggg aca gac ttc act ctc acc atc agc agc cta gag cct	240
Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro	
65 70 75 80	

gaa gat ttt gca gtt tat tac tgt cag cag cgt agc aac tgg cct cca	288
Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro	
85 90 95	

ttc act ttc ggc cct ggg acc aaa gtg gat atc aaa	324
Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys	
100 105	

<210> 40

<211> 108

<212> PRT

<213> Homo sapiens

<400> 40

Glu Ile Val Leu Thr Gln Ser Pro Ala Thr Leu Ser Leu Ser Pro Gly	
1 5 10 15	

Glu Arg Ala Thr Leu Ser Cys Arg Ala Ser Gln Ser Val Ser Ser Tyr	
20 25 30	

Leu Ala Trp Tyr Gln Gln Lys Pro Gly Gln Ala Pro Arg Leu Leu Ile	
35 40 45	

Tyr Asp Ala Ser Asn Arg Ala Thr Gly Ile Pro Ala Arg Phe Ser Gly	
50 55 60	

Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile Ser Ser Leu Glu Pro	
65 70 75 80	

Glu Asp Phe Ala Val Tyr Tyr Cys Gln Gln Arg Ser Asn Trp Pro Pro	
85 90 95	

HOI-14402.ST25.txt

Phe Thr Phe Gly Pro Gly Thr Lys Val Asp Ile Lys
100 105

<210> 41
<211> 15
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(15)
<223> Sequence from human antibody generated in mouse.

<400> 41
agc ttt tgg atg agc 15
Ser Phe Trp Met Ser
1 5

<210> 42
<211> 5
<212> PRT
<213> Homo sapiens

<400> 42
Ser Phe Trp Met Ser
1 5

<210> 43
<211> 30
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(30)
<223> Sequence from human antibody generated in mouse.

<400> 43
aac ata aag caa gat gga agt gag aaa ttc 30
Asn Ile Lys Gln Asp Gly Ser Glu Lys Phe
1 5 10

<210> 44
<211> 10
<212> PRT
<213> Homo sapiens

<400> 44
Asn Ile Lys Gln Asp Gly Ser Glu Lys Phe
1 5 10

<210> 45

HOI-14402.ST25.txt

<211> 54
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(54)
<223> Sequence from human antibody generated in mouse.

<400> 45
gat cgt att aca atg gtt cg^g ccc tat tac tac ttc tac aac ggt ctg 48
Asp Arg Ile Thr Met Val Arg Pro Tyr Tyr Tyr Phe Tyr Asn Gly Leu
1 5 10 15

gac gtc 54
Asp Val

<210> 46
<211> 18
<212> PRT
<213> Homo sapiens

<400> 46
Asp Arg Ile Thr Met Val Arg Pro Tyr Tyr Tyr Phe Tyr Asn Gly Leu
1 5 10 15

Asp Val

<210> 47
<211> 381
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (1)..(381)
<223> Sequence from human antibody generated in mouse.

V-segment: 3-7, D-segment: 3-10 and J-segment: JH6b

<220>
<221> CDR1
<222> (91)..(102)

<220>
<221> CDR2
<222> (148)..(177)

<220>
<221> CDR3
<222> (295)..(348)

<400> 47
gag gta cag ctg gtg gag tct ggg gga ggc ttg gtc cag ccg ggg ggg 48
Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly Gly

HOI-14402.ST25.txt

1	5	10	15	
tcc ctg aga ctc tcc tgt gca gct tct gga ttc acc ttt agt agc ttt				96
Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Phe				
20	25		30	
tgg atg agc tgg gtc cgc cag gct cca ggg aag ggg ctg gag tgg gtg				144
Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val				
35	40		45	
gcc aac ata aag caa gat gga agt gag aaa ttc tat gtg gac tct gtg				192
Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Phe Tyr Val Asp Ser Val				
50	55		60	
aag ggc cga ttc acc atc tcc aga gac aac gcc aag aac tca ctg tat				240
Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr				
65	70		75	80
ctg caa atg aac agc ctg aga gcc gag gac acg gct gtg tat tac tgt				288
Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys				
85	90		95	
gcg agg gat cgt att aca atg gtt cgg ccc tat tac tac ttc tac aac				336
Ala Arg Asp Arg Ile Thr Met Val Arg Pro Tyr Tyr Tyr Phe Tyr Asn				
100	105		110	
ggt ctg gac gtc tgg ggc caa ggg acc acg gtc acc gtc tcc tca				381
Gly Leu Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser				
115	120		125	

<210> 48
<211> 127
<212> PRT
<213> Homo sapiens

<400> 48

Glu Val Gln Leu Val Glu Ser Gly Gly Leu Val Gln Pro Gly Gly
1 5 10 15

Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser Ser Phe
20 25 30

Trp Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu Glu Trp Val
35 40 45

Ala Asn Ile Lys Gln Asp Gly Ser Glu Lys Phe Tyr Val Asp Ser Val
50 55 60

Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ala Lys Asn Ser Leu Tyr
65 70 75 80

Leu Gln Met Asn Ser Leu Arg Ala Glu Asp Thr Ala Val Tyr Tyr Cys
85 90 95

Ala Arg Asp Arg Ile Thr Met Val Arg Pro Tyr Tyr Tyr Phe Tyr Asn
Page 18

HOI-14402.ST25.txt

Gly Leu Asp Val Trp Gly Gln Gly Thr Thr Val Thr Val Ser Ser
115 120 125

<210> 49
<211> 930
<212> DNA
<213> *Streptococcus pneumoniae*

<220>
<221> CDS
<222> (1)..(930)
<223> Sequence of Streptococcus pneumoniae surface adhesin A (PsaA)- A Variant

<400> 49
atg aaa aaa tta ggt aca tta ctc gtt ctc ttt ctt tct gca atc att 48
Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile
1 5 10 15

```

ctt gta gca tgt gct agc gga aaa aaa gat aca act tct ggt caa aaa 96
Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys
          20           25           30

```

ctt aaa gtt gtt gct aca aac tca atc atc gct gat att act aaa aat 144
 Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn
 35 40 45

att gct ggt gac aaa att gac ctt cat agt atc gtt ccg att ggg caa
Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln
50 55 60

gac cca cac gaa tac gaa cca ctt cct gaa gac gtt aag aaa act tct 240
 Asp Pro His Glu Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser
 65 70 75 80

gag gct gat ttg att ttc tat aac ggt atc aac ctt gaa aca ggt ggc 288
 Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly
 85 90 95

```

aat gct tgg ttt aca aaa ttg gta gaa aat gcc aag aaa act gaa aac      336
Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn
          100           105           110

```

aaa gac tac ttc gca gtc agc gac ggc gtt gat gtt atc tac ctt gaa
Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu
115 120 125 384

ggt caa aat gaa aaa gga aaa gaa gac cca cac gct tgg ctt aac aat ctt
 Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu
 130 135 140

gaa aac ggt att att ttt gct aaa aat atc gcc aaa caa ttg agc gcc 480
 Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala
 145 150 155 160

aaa gac cct aac aat aaa gaa ttc tat gaa aaa aat ctc aaa gaa tat 528
 Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr
 165 170 175

HOI-14402.ST25.txt

act gat aag tta gac aaa ctt gat aaa gaa agt aag gat aaa ttt aat	576
Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn	
180 185 190	
aag atc cct gct gaa aag aaa ctc att gta acc agc gaa gga gca ttc	624
Lys Ile Pro Ala Glu Lys Leu Ile Val Thr Ser Glu Gly Ala Phe	
195 200 205	
aaa tac ttc tct aaa gcc tat ggt gtt cca agt gcc tac atc tgg gaa	672
Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu	
210 215 220	
atc aat act gaa gaa gga act cct gaa caa atc aag acc ttg gtt	720
Ile Asn Thr Glu Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val	
225 230 235 240	
gaa aaa ctt cgc caa aca aaa gtt cca tca ctc ttt gta gaa tca agt	768
Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser	
245 250 255	
gtg gat gac cgt cca atg aaa act gtt tct caa gac aca aac atc cca	816
Val Asp Asp Arg Pro Met Lys Thr Val Ser Gln Asp Thr Asn Ile Pro	
260 265 270	
atc tac gca caa atc ttt act gac tct atc gca gaa caa ggt aaa gaa	864
Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu	
275 280 285	
ggc gac agc tac tac agc atg atg aaa tac aac ctt gac aag att gct	912
Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala	
290 295 300	
gaa gga ttg gca aaa taa	930
Glu Gly Leu Ala Lys	
305	

<210> 50
<211> 309
<212> PRT
<213> Streptococcus pneumoniae

<400> 50

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln
50 55 60

Asp Pro His Glu Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser
65 70 75 80

HOI-14402.ST25.txt

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu
210 215 220

Ile Asn Thr Glu Glu Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val
225 230 235 240

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser
245 250 255

Val Asp Asp Arg Pro Met Lys Thr Val Ser Gln Asp Thr Asn Ile Pro
260 265 270

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala
290 295 300

Glu Gly Leu Ala Lys
305

HOI-14402.ST25.txt

<211> 25
<212> PRT
<213> Streptococcus pneumoniae

<400> 51

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys
20 25

<210> 52
<211> 25
<212> PRT
<213> Streptococcus pneumoniae

<400> 52

Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys Leu Lys Val Val
1 5 10 15

Ala Thr Asn Ser Ile Ile Ala Asp Ile
20 25

<210> 53
<211> 25
<212> PRT
<213> Streptococcus pneumoniae

<400> 53

Ile Ile Ala Asp Ile Thr Lys Asn Ile Ala Gly Asp Lys Ile Asp Leu
1 5 10 15

His Ser Ile Val Pro Ile Gly Gln Asp
20 25

<210> 54
<211> 65
<212> PRT
<213> Streptococcus pneumoniae

<400> 54

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn
35 40 45

HOI-14402.ST25.txt
Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln
50 55 60

Asp
65

<210> 55
<211> 960
<212> DNA
<213> Streptococcus pneumoniae

<220>
<221> CDS
<222> (1)..(930)
<223> sequence of Streptococcus pneumoniae surface adhesin A (PsaA)

<400> 55
atg aaa aaa tta ggt aca tta ctc gtt ctc ttt ctt tct gca atc att 48
Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile
1 5 10 15

ctt gta gca tgt gct agc gga aaa aaa gat aca act tct ggt caa aaa 96
Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys
20 25 30

cta aaa gtt gtt gct aca aac tca atc atc gct gat att act aaa aat 144
Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn
35 40 45

att gct ggt gac aaa att gac ctt cat agt atc gtt ccg att ggg caa 192
Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln
50 55 60

gac cca cac gaa tac gaa cca ctt cct gaa gac gtt aag aaa act tct 240
Asp Pro His Glu Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser
65 70 75 80

gag gct gat ttg att ttc tat aac ggt atc aac ctt gaa aca ggt ggc 288
Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly
85 90 95

aat gct tgg ttt aca aaa tta gta gaa aat gcc aag aaa act gaa aac 336
Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn
100 105 110

aaa gac tac ttc gca gtc agc gac ggc gtt gat gtt atc tac ctt gaa 384
Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu
115 120 125

ggt caa aat gaa aaa gga aaa gaa gac cca cac gct tgg ctt aac ctt 432
Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu
130 135 140

gaa aac ggt att att ttt gct aaa aat atc gcc aaa caa ttg agc gcc 480
Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala
145 150 155 160

aaa gac cct aac aat aaa gaa ttc tat gaa aaa aat ctc aaa gaa tat 528
Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr
165 170 175

HOI-14402.ST25.txt

act gat aag tta gac aaa ctt gat aaa gaa agt aag gat aaa ttt aat	576
Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn	
180 185 190	
aag atc cct gct gaa aag aaa ctc att gta acc agc gaa gga gca ttc	624
Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe	
195 200 205	
aaa tac ttc tct aaa gcc tat ggt gtt cca agt gcc tac atc tgg gaa	672
Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu	
210 215 220	
atc aat act gaa gaa gga act cct gaa caa atc aag acc ttg gtt	720
Ile Asn Thr Glu Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val	
225 230 235 240	
gaa aaa ctt cgc caa aca aaa gtt cca tca ctc ttt gta gaa tca agt	768
Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser	
245 250 255	
gtg gat gac cgt cca atg aaa act gtt tct caa gac aca aac atc cca	816
Val Asp Asp Arg Pro Met Lys Thr Val Ser Gln Asp Thr Asn Ile Pro	
260 265 270	
atc tac gca caa atc ttt act gac tct atc gca gaa caa ggt aaa gaa	864
Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu	
275 280 285	
ggc gac agc tac tac agc atg atg aaa tac aac ctt gac aag att gct	912
Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala	
290 295 300	
gga gga ttg gca aaa taa gacaaggattt ctgaaggattt ggcaaaataaa	960
Gly Gly Leu Ala Lys	
305	

<210> 56
<211> 309
<212> PRT
<213> Streptococcus pneumoniae

<400> 56

Met Lys Lys Leu Gly Thr Leu Leu Val Leu Phe Leu Ser Ala Ile Ile
1 5 10 15

Leu Val Ala Cys Ala Ser Gly Lys Lys Asp Thr Thr Ser Gly Gln Lys
20 25 30

Leu Lys Val Val Ala Thr Asn Ser Ile Ile Ala Asp Ile Thr Lys Asn
35 40 45

Ile Ala Gly Asp Lys Ile Asp Leu His Ser Ile Val Pro Ile Gly Gln
50 55 60

Asp Pro His Glu Tyr Glu Pro Leu Pro Glu Asp Val Lys Lys Thr Ser
65 70 75 80

HOI-14402.ST25.txt

Glu Ala Asp Leu Ile Phe Tyr Asn Gly Ile Asn Leu Glu Thr Gly Gly
85 90 95

Asn Ala Trp Phe Thr Lys Leu Val Glu Asn Ala Lys Lys Thr Glu Asn
100 105 110

Lys Asp Tyr Phe Ala Val Ser Asp Gly Val Asp Val Ile Tyr Leu Glu
115 120 125

Gly Gln Asn Glu Lys Gly Lys Glu Asp Pro His Ala Trp Leu Asn Leu
130 135 140

Glu Asn Gly Ile Ile Phe Ala Lys Asn Ile Ala Lys Gln Leu Ser Ala
145 150 155 160

Lys Asp Pro Asn Asn Lys Glu Phe Tyr Glu Lys Asn Leu Lys Glu Tyr
165 170 175

Thr Asp Lys Leu Asp Lys Leu Asp Lys Glu Ser Lys Asp Lys Phe Asn
180 185 190

Lys Ile Pro Ala Glu Lys Lys Leu Ile Val Thr Ser Glu Gly Ala Phe
195 200 205

Lys Tyr Phe Ser Lys Ala Tyr Gly Val Pro Ser Ala Tyr Ile Trp Glu
210 215 220

Ile Asn Thr Glu Glu Glu Gly Thr Pro Glu Gln Ile Lys Thr Leu Val
225 230 235 240

Glu Lys Leu Arg Gln Thr Lys Val Pro Ser Leu Phe Val Glu Ser Ser
245 250 255

Val Asp Asp Arg Pro Met Lys Thr Val Ser Gln Asp Thr Asn Ile Pro
260 265 270

Ile Tyr Ala Gln Ile Phe Thr Asp Ser Ile Ala Glu Gln Gly Lys Glu
275 280 285

Gly Asp Ser Tyr Tyr Ser Met Met Lys Tyr Asn Leu Asp Lys Ile Ala
290 295 300

Gly Gly Leu Ala Lys
305